

INDEX OF SURGICAL PROGRESS.

GENERAL SURGERY.

I Upon Catgut Infection. By C. BRUNNER (Zurich). Brunner discusses the manner of manufacture of catgut and the methods of preparation and preservation for surgical use. He points to the fact that Reverdin first taught the method of sterilization by dry heat and obtained an excellent result. Published instances of catgut infection by Kocher, Zweifel, Volkmann and others are referred to, these being entirely due to catgut prepared by carbolic acid oil.

In answer to the question addressed to many surgical and gynæcological clinics regarding experiences with catgut, invariably favorable replies, particularly with reference to sublimate catgut, were returned. During the past four years, in the Zurich clinic, a careful search has failed to reveal any complication that could be referred to this material. This included herniotomies, laparotomies and extirpations of the thyroid body. Similar experiences were gleaned from the work of Sanger, Crede and Caruso in the use of catgut as buried uterine sutures in Cæsarean section.

As to the absorbability of different methods of preparation of catgut, the author agrees with Bruns that in case of suppuration more rapid disintegration of this material occurs, while in other cases, or those pursuing an aseptic course, an essential difference is to be observed. All methods of preparation lessen the resistance of the catgut in the tissues as compared with raw gut; this is less observed in the chromic acid methods of treatment, as well as that of Reverdin.

The second portion of Brunner's article is taken up with an exceedingly valuable contribution to the bacteriological study of catgut in its surgical relations.

In examining catgut from different sources, and kept for different

lengths of time, it was shown that the sublimative disinfection as carried on in the factories was such as to render the material absolutely and permanently free from germs ; Reverdin's catgut likewise proved itself to be without exception sterile. Catgut prepared in carbolic acid, chromic acid and in juniper oil was found, not infrequently, to contain micro-organisms, although, indeed, these were not of a pathogenic character.

Brunner directed his attention particularly to methods of sterilization which should guard against anthrax infection. Catgut known to be thus infected was employed. As a result of this he holds the following method of preparation to be the best :

Raw catgut is thoroughly scrubbed with a brush and potash soap, and then directly, after a half hour's exposure to ether, where it should remain for 12 hours in a 1:1000 watery solution of sublimate. It is then preserved in sublimate 1 part, alcohol 900 parts and glycerine 100 parts.

Experience does not seem to have supported the observations of Kocher regarding the applicability of silk as material for ligature in place of catgut. Those who have followed the warning of the latter surgeon and have substituted the former for the last named material have very soon discovered this fallacy and have been obliged to return to catgut. The same may be said of those who have found refuge in linen thread as a substitute for catgut. Although such substitution may at first sight appear to be a simplification of the antiseptic apparatus, yet it really is a backward step.—*Beitrag zur klin Chirg.* Bd. vi.

II. Bacteriological and Critical Researches upon the Manufacture of Catgut. By DR. E. BRATZ (Heidelberg). In the first place Bratz calls attention to the presence of fat in catgut; and points to the absolute necessity for the removal of this before any antiseptic agent can exert its free influence upon the material. He then criticizes Brunner's researches, particularly with reference to those experiments which point to reliance upon the destruction of the bacilli of anthrax, which are easily destroyed, and not upon the

sterilization of the spores themselves, which is much more difficult of accomplishment. Further, according to the recently published observations of Geppert, all antiseptic substances which have been introduced with the substance of the catgut should be precipitated or neutralized in order to draw proper conclusions regarding the germicidal value of the particular procedure under trial.

Catgut contains about 15% of fat. Ether is the best means of removing this. Sterilization is best accomplished by means of the dry heat process of Reverdin (3 hours' exposure to a temperature of 140° C.). A special oven with double walls filled with oil, with the thermostat of Reichert, is recommended for this purpose. The further preservation of the gut is carried on in alcohol.

Bratz concedes that raw catgut, as heretofore procured, has been comparatively free from germ infection; a rational method of sterilization is indicated, in spite of this relative immunity, however.

Bratz further proposes to expose raw catgut from 1 to 2 days in ether, in order to remove its fat, and to then immerse for 24 hours in 1-1000 solution of sublimate. It is then preserved permanently in absolute alcohol: or, as before suggested, to sterilize by means of dry heat, after Reverdin, and preserve by means of absolute alcohol. — *Beitrage zur klin Chirg.*, bd. vii.

GEO. R. FOWLER (Brooklyn).

III. On the Antiseptic Action of Salol. By Dr. F. PAPULI (Naples, Italy). The author experimented with salol as an antiseptic and deduces the following:

1. Salol has pronounced antiseptic properties, especially against certain micro-organisms.
2. Its antiseptic action is due to its decomposition.
3. This decomposition is produced by the micro-organisms themselves.
4. All micro-organisms decompose it; but, those which decompose it the most actively lose their vitality, while those which only partly act upon it become attenuated and, finally, those which influence it but slightly remain active.

Finally, salol has an important influence upon suppuration. Al-

though this was well known in medical practice, as, for example, in cystitis and pyelitis, as well as in surgery, these experiments would seem to present a clear explanation of its favorable action. While all the writers in their publications speak in general of an antiseptic action and Gratzner of a detergative and exsiccating influence, from experiments, one comes to the conclusion that the antiseptic action of salol upon suppuration consists in the property which pyogenic micro-organisms have in decomposing it and remaining inactive after its decomposition. Its action upon the surfaces of wounds may be considered as double; the salol in the inferior stratum decomposes and renders the cause of suppuration powerless; while, in the superior, salol being like iodoform insoluble, it protects the wound from external agents, remains unaltered in the secretions of the wound while those secretions which contain micro-organisms are disinfected.—*Rivista Clinica e Terapeutica*, 9, 1890.

A. PICK (Boston).

IV. Pyoktanin and Peruvian Balsam in Surgical Practice. By DR. VLADIMIR A. TILE (St. Petersburg, Russia). The author, house surgeon to the Krasnoselsky Military Hospital, details his experience of the new antiseptics, coming to the following general conclusions: *A. Pyoktanin.* 1, When used in the shape of a 1 to 1000 solution, the substance actually proves to be a reliable disinfectant, but at the same time gives rise to considerable local pain and inflammatory reaction, as well as to a general systemic disturbance. 2, In weaker solutions the drug is altogether useless. 3, The only advantages of pyoktanin consist in, *a*, its being free from odor, and, *b*, decreasing discharges from wounds. *B. Peruvian Balsam.* 1, It does not produce any impression on ordinary wounds. 2, But it invariably secures excellent results in cases of tubercular ulcers. Under the influence of gauze tampons, soaked in the substance, the discharge steadily decreases, its quality improves, bleeding and erethic granulations disappear and the lesion rapidly heals, while the patient's general state undergoes a distinct amelioration. 3, To obtain all the effects, however, the tampons should be frequently changed, and, besides, carefully applied in such a way as to keep them in contact with the whole ulcerated surface.—*Vratch*, No. 50, 1890, p. 1146.

V. On Blue Suppuration. By DR. M. M. KUZNETZOFF (Kharkov, Russia). The writer, house-surgeon to Prof. W. F. Grube's clinic, contributes a valuable monograph on the question, embodying his own clinical observations and bacteriological researches (in Prof. V. P. Kryloff's laboratory). The first case, which came under his notice in the said clinic, referred to a Cossack, in whom, shortly after a total excision of a scapula (on account of sarcoma), the discharge suddenly assumed a blue greenish color. A few days later the same phenomenon was observed in two other male patients, his neighbors in the ward, while a fortnight afterwards the "blue suppuration" spread to female wards. In all, 18 cases of the kind occurred in the course of two consecutive academical years. The discoloration appeared always quite suddenly, to persist, as a rule, for a more or less prolonged period, until certain special measures were adopted, after which it gradually ceased. The color of the discharge and dressing varied between a grass green with a yellowish hue, and a beautiful emerald-green. In some cases the whole dressing (gauze and cotton wool) was found to be dyed more or less equally and richly, while in others only isolated palish spots could be detected, the superficial layers being invariably thickened most intensely. Usually, the macerated cuticle of the wound's edges would also assume a bluish-green color, the staining penetrating down to the deeper strata of the horny structure. In 15 out of 18 patients the appearance of blue suppuration was accompanied by a rise of the systemic temperature up to 38° or 38.7°C., while after the discoloration having been removed by means of a thorough disinfection, the temperature returned to the standard. In such febrile patients the blue staining reached more intense degrees than in the other 3 cases in which the temperature remained normal. In every one and all of the author's cases there was present a quite peculiar (specific) sweet and aromatic odor about the dressings and wound which resembled that of blooming bird cherry, and was dependent upon the presence of pyocyanin. The essential corollaries drawn by the writer from his investigations may be given somewhat as follows: 1, The so-called "blue suppuration" is caused by two different species of chromogenic ærobie bacteria—by Ledderhose's *bacillus pyocyanus* (Ernst's *C. pyocyanus* B.) and *bacillus pyofluorescent* (Ernst's

C. pyocyaneus X.), which occur either simultaneously or separately. The discoloration of the discharge depends upon pyocyanin, a pigment substance, elaborated by the microbes, and partly upon pyoxanthose, which constitutes a product of oxidation of the former body. 2, In animals (dogs and rabbits) subcutaneous injections of either of the microbes ("pure cultures") are followed by local infiltration, inflammation and suppuration. On injecting large doses there also supervene anorexia, general prostration, diarrhoea, and intense fever, the case frequently ending in death. 3, Intraperitoneal injection of the cultures give rise to hæmorrhagic, fibrinous, general peritonitis, always terminating lethally. 4, Intravenous injections produce an acute disease, characterized by high fever, anorexia, diarrhoea, prostration and convulsions, and ending in death in from 30 to 48 hours after the injection. 5, Sterilized cultures of the microbes (in other words, their metabolic products alone) similarly possess phlogogenic, pyrogenic and pyogenic properties, though in a somewhat mitigated degree. 6, The *bacillus pyocyaneus* seems to be endowed with a more energetical pathogenic action than the *bacillus pyofluorescent*. 7, In man the pathogenic effects are comparatively less marked than in lower animals. Still, either of the bacteria undoubtedly can make and intensify suppuration, and produce fever. 8, On the whole, the prevailing view according to which blue suppuration should be regarded as a trivial or harmless complication of the wound, is decidedly wrong. On the contrary, the "cyanomycosis" forms a serious, infectious complication, since the morbid process distinctly retards healing of the lesion and is characterized by a refractory and tedious course and contagiousness (being easily transmitted from wound to wound, from man to man). 9, Hence, as soon as the complication arises, the wound should be subjected to a systematic and energetic disinfection. The best treatment consists in washing out with a 1 to 1000 solution of corrosive sublimate, or a 4% or 5% solution of chloride of zinc, or a 5% one of carbolic acid. The affection being contagious, the surgeon should adopt such precautions as disinfecting his hands after handling a cyanomycotic wound, using special instruments for the latter, and so on.—*Khirurgichesky Vestnik*, October and November, 1890, pp. 583-628.

VALERIUS IDELSON (Berne).